

CLAIMS:

1. A process for producing a thin film of an I-III-VI₂, comprising:

5 a first step of forming a thin film of a III-VI compound on a substrate by Metal Organic Chemical Vapor Deposition using a single precursor including elements of Groups III and VI;

10 a second step of forming a thin film of an I₂-VI compound on the thin film of the III-VI compound by Metal Organic Chemical Vapor Deposition using a precursor including metals of Group I; and

15 a third step of forming a thin film of the I-III-VI₂ compound on the thin film of the I₂-VI compound by Metal Organic Chemical Vapor Deposition using a single precursor including elements of Groups III and VI.

20 2. The process as set forth in claim 1, further comprising a fourth step of forming a thin film of an I-III-VI₂ compound on the thin film of the I-III-VI₂ compound formed in the third step by Metal Organic Chemical Vapor Deposition using a single precursor including elements of Groups III and VI, and wherein elements of Group III used in the fourth step are different from those used in the first and third steps.

3. The process as set forth in claim 1, further comprising a fourth step of forming a thin film of an I-III-VI₂ compound on the thin film of the I-III-VI₂ compound formed in the third step by Metal Organic Chemical Vapor Deposition using a single precursor including elements of Groups III and VI, and wherein elements of Group VI used in the fourth step are different from those used in the first and third steps.

4. The process as set forth in any one of claims 1 through 3, wherein the precursors used in the first and third steps are $[\text{Me}_2\text{In}-(\mu\text{SeMe})]_2$.

5. The process as set forth in any one of claims 1 through 3, wherein the precursor used in the second step is $(\text{hfac})\text{Cu}(\text{DMB})$.

6. The process as set forth in claim 2, wherein the fourth precursor is $[\text{Me}_2\text{Ga}-(\mu\text{SeMe})]_2$.

7. The process as set forth in claim 2, wherein the thin film of an I-III-VI₂ compound is selected from the group consisting of $\text{CuIn}_{1-x}\text{Ga}_x\text{Se}_2$, $\text{CuIn}_{1-x}\text{Al}_x\text{Se}_2$, $\text{CuGa}_{1-x}\text{Al}_x\text{Se}_2$, $\text{AgIn}_{1-x}\text{Ga}_x\text{Se}_2$, $\text{AgIn}_{1-x}\text{Al}_x\text{Se}_2$ and $\text{AgIn}_{1-x}\text{Ga}_x\text{Se}_2$.

8. The process as set forth in claim 3, wherein the thin film of an I-III-VI₂ compound is selected from the group consisting of CuIn(Se,S)₂, CuGa(Se,S)₂, AgIn(Se,S)₂,
5 AgGa(Se,S)₂, CuIn(Se,Te)₂, CuGa(Se,Te)₂, AgIn(Se,Te)₂,
AgGa(Se,Te)₂, CuIn(S,Te)₂, CuGa(S,Te)₂, AgIn(S,Te)₂ and AgGa(S,Te)₂.

9. A process for producing an absorption layer for a solar cell, comprising the steps of:

forming an InSe thin film on a substrate by Metal Organic Chemical Vapor Deposition using a single precursor including In and Se;

forming a Cu₂Se thin film on the InSe thin film by Metal Organic Chemical Vapor Deposition using a Cu precursor;
15 and

forming a CuInSe₂ thin film on the Cu₂Se thin film by Metal Organic Chemical Vapor Deposition using a single precursor including In and Se.

10. The process as set forth in claim 9, further comprising the step of forming a CuIn_{1-x}Ga_xSe₂ thin film on the CuInSe₂ thin film by Metal Organic Chemical Vapor Deposition using a single precursor including Ga and Se.